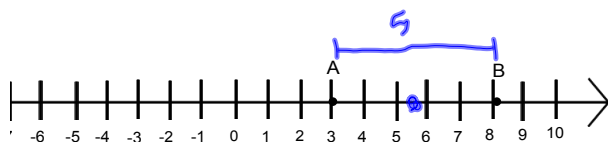
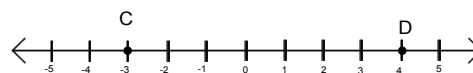


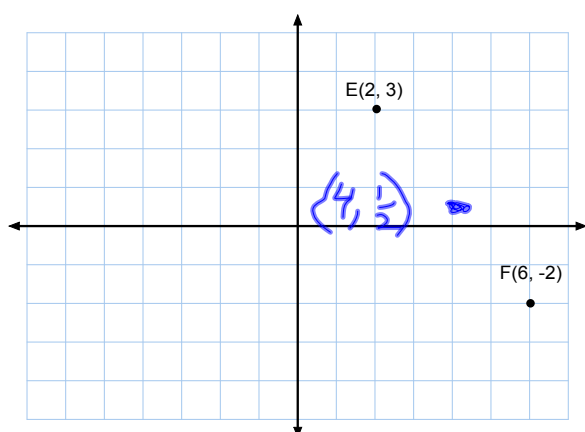
8-1 Midpoint and Distance Formulas



$$\frac{3+8}{2} = 5.5$$



$$\frac{-3+4}{2} = \frac{1}{2}$$



Midpoint Formula

$$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

Find the midpoint of:

A(4, 3)

B(-2, 5)

$$M\left(\frac{4-2}{2}, \frac{3+5}{2}\right)$$

M is the midpoint of \overline{AB} . Find the other endpoint if:

A(8, 3)

M(12, 5)

B(?, ?)

$$\frac{8+x}{2} = 12 \quad \frac{3+y}{2} = 5$$

$$8+x = 24 \quad 3+y = 10$$

$$x = 16 \quad y = 7$$

B(16, 7)

A(-1, 0)

M(-3, 5)

B(?, ?)

$$\frac{-1+x}{2} = -3 \quad \frac{0+y}{2} = 5$$

$$-1+x = -6 \quad y = 10$$

$$x = -5 \quad y = 10$$

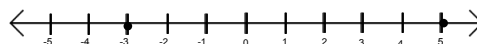
B(-5, 10)

Find the distance between the two points.

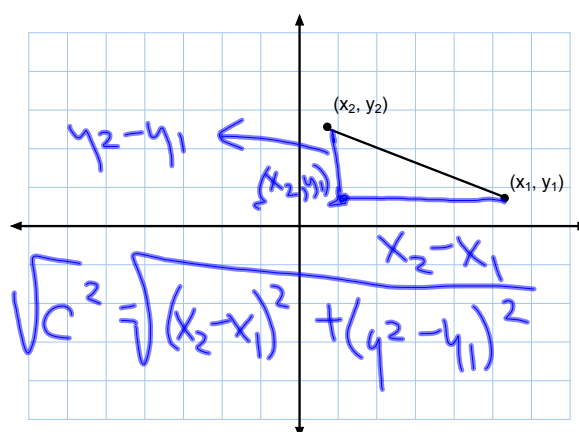
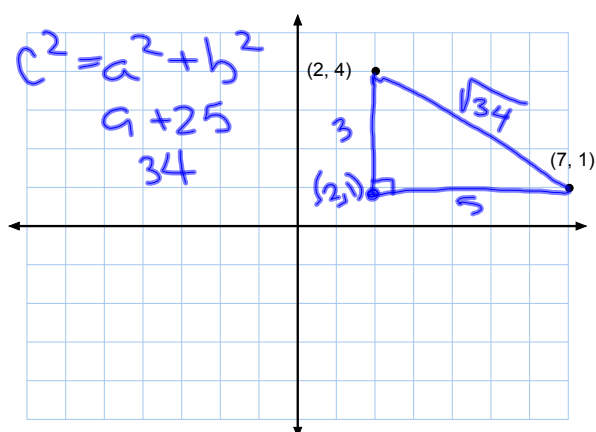


$$|10 - (-3)| = 13$$

$$|-3 - 10| = 13$$



$$d = 8$$



The Distance Formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Find the distance between:

$(-1, 4)$ $(2, -3)$

$$d = \sqrt{(2 - (-1))^2 + (-3 - 4)^2}$$

$$9 + 49$$

$$\sqrt{58}$$

$$\sqrt{5^2 + 12^2}$$

$$\sqrt{169}$$

$$13$$

$$\sqrt{5^2} + \sqrt{12^2}$$

$$5 + 12 = 17$$

Find the distance between:

$(2, -5)$ $(3, 1)$

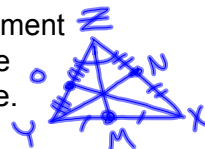
$$d = \sqrt{(3 - 2)^2 + (1 - (-5))^2}$$

$$\sqrt{37}$$

The Distance Formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Median of a triangle--is a segment that connects a vertex and the midpoint of the opposite side.



Example 1:

Find the length of the median from C to \overline{AB} .

A(-3, 0)

B(3, 2)

C(2, -4)



Find M $\left(\frac{-3+3}{2}, \frac{0+2}{2} \right)$

M(0, 1)
C(2, -4)

$$d = \sqrt{(2 - 0)^2 + (-4 - 1)^2}$$

$$d = \sqrt{29}$$

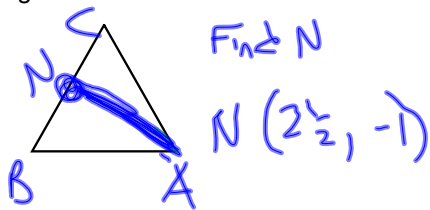
Example 2:

Find the length of the median from A to \overline{CB} .

A(-3, 0)

B(3, 2)

C(2, -4)



$$NA = \sqrt{\left(\frac{5}{2} - (-3)\right)^2 + (-1 - 0)^2}$$

$$\frac{121}{4} + \frac{4}{4}$$

$$\sqrt{\frac{125}{4}} = \frac{5\sqrt{5}}{2}$$

HW

p414-415

11-17, 25-33 odd, 36, 37